Notes on Jet Corrections (JTC96X)

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Level of Correction:

1. Scale corrections (not implemented)
2. Relative Energy corrections (implemented?)
3. Multiple Interaction corrections
4. Absolute Energy corrections
5. Underlying energy corrections
6. Out of cone corrections

Jet Correction Parameters

- level=1 through 6 as explained above.
- nvtx: The number of class 12 vertices
- coneSize : 0.4, 0.7 and 1.0
- version : Monte Carlo (0) / data (1)

Jet Correction Levels

- **Scale Corrections**

These corrections can multiple each jet E_T by a scale factor independent of E_T. They were part of run I to correct the EM scale change over the run and may not be needed for Run II. Currently a scale factor of 1.0 is used.

- **Relative Energy corrections**

These corrections depend on E_T and η of the jet and make the jet energy scale uniform over the whole detector, setting it equal to energy scale in $0.1 < |\eta| < 0.7$. **not yet available in the code (?)**
$\rightarrow$ **Strange η dependence ($\eta > 0$ vs $\eta < 0$)**

- **Multiple Interaction Corrections**

Corrects the calorimeter-level jet energy for any additional interaction in the same event. The correction is based on the number of class 12 vertices (nvtx) in the event. If nvtx=0, MI energy, averaged over run, measured from minimum bias data, is subtracted.

pt -= (nvtx-1)*UDEVT[version][cone]

$\rightarrow$ **We should check the whole thing again...**

Jet Correction Levels

- **Absolute Energy Corrections**

Corrects the jet energy observed in the calorimeter to the sum Pt of the particles within the cone of same size around the parton direction which matched the jet direction with $\delta R < 0.5$ The correction factor is parameterized separately for below and above 100 GeV.

pt = QUAP0[ipt][cone]+QUAP1[ipt][cone]*pt+QUAP2[ipt][cone]*pt*pt

→ **Use jet-algorithm at hadron level to find this!**

- **Underlying Energy Corrections**

Subtracts the underlying energy from the particle-level jet energy. The UE energy was measured from minimum bias data and corrected for calorimeter response by multiplying it by 1.6.

pt -= UD1EVT[version][cone]

→ **No dependence with rapidity?**

→ **Compare with MC including UE**

→ **Use jet-algorithm at hadron level**

- **Out of Cone Corrections**

Corrected the particle-level energy for the radiations outside the clustering cone, taking the "jet energy" back to "parent parton energy".

pt += A[cone]*(1.0-B[cone]*exp(-C[cone]*pt))

→ **Depends on parton contents (gluons, quarks)**

→ **Different (gluons, quarks) jet contents vs η**